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REMARKS

The Official Action of July 1, 2003, and the prior art relied upon therein have been carefully reviewed. The claims in the application are now claims 1-5, 7-12, and 14-18, and these claims define patentable subject matter warranting their allowance. Accordingly, the applicants respectfully request favorable reconsideration and allowance.

Acknowledgement by the PTO of the receipt of applicants' papers filed under Section 119 is noted.

Claims 3, 4, 10 and 11 have been rejected under the second paragraph of §112. The rejection is respectfully traversed.

The amendments to claims 3 and 4 presented above should obviate this rejection.

For the record, however, applicants maintain that those skilled in the art, particularly upon consideration of applicants' specification (fully consistent with the law), would understand what is meant by hard particles and soft metal. As the prior art rejections point out, the prior art discloses hard particles, and of course an applicant may very well rely on what is known in the prior art. Soft metals *per se* are also known in the prior art. Therefore, the present

applicants believe the rejection is unjustified, because those skilled in the art know what the criticized terms mean.

Applicants respectfully request withdrawal of the rejection.

Claims 1-16 have been rejected as obvious under §103 from Kamiya et al USP 5,525,246 (Kamiya) in view of Oohira et al USP 6,569,816 (Oohira). This rejection is respectfully traversed.

The invention as called for in claim 1 provides a sliding bearing comprising a bearing alloy layer having a sliding surface, and a resin surface layer provided on the sliding surface of the bearing alloy layer and containing 20 to 95% by volume of polybenzimidazole as a base resin and 5 to 80% by volume of a solid lubricant.

Claim 2 recites a bonding layer comprising a thermosetting resin and further comprising one or more of polyamide-imide, polyimide, epoxy resin and phenol resin, provided on the sliding surface of the bearing alloy layer. The rejection states that the aforesaid bonding layer is obvious from Kamiya wherein a coating layer comprises two layers made by adding to a PI binder two types of solid lubricants differing in density from each other.

Claim 3 recites the resin surface layer further containing not more than 5% by volume of hard particles

comprising one or more of a nitride, an oxide and a carbide and not more than 10% by volume of a soft metal comprising one or more copper, silver, gold, aluminum, tin, zinc or alloys of the metals.

However, in the present invention as called for in claim 2, the coating layer does not comprise two layers made by adding to a PI binder two types of solid lubricants differing in density from each other. The invention claimed in claim 2 is characterized in that a resin surface layer comprising a base resin of polybenzimidazole (PBI), differing from the base resin of the bonding layer, provided as a second layer on the bonding layer comprising a thermosetting resin.

Kamiya discloses a sliding bearing material comprising an aluminum bearing alloy and a coating layer formed on the alloy. Kamiya discloses that the surface resin layer comprises polyamide and a solid lubricant and that a bonding layer is provided between the surface resin layer and the bearing alloy layer.

The rejection states that  $\text{CrO}_3$ ,  $\text{PbO}$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{SiC}$  or the like reads as "hard particles and a soft metal." These correspond to the hard particles comprising one or more of a nitride, an oxide and a carbide as now recited in claim 3. But applicant cannot understand what the PTO means as a soft metal in this context. If the Examiner understands that a soft metal

is a solid lubricant such as MoS<sub>2</sub>, BN, WS<sub>2</sub>, graphite or the like, these may indeed be soft, but they certainly are **not** metals. Kamiya does not disclose or suggest any addition of a soft metal comprising one or more of copper, silver, gold, aluminum, tin, zinc or alloys of such metals as recited in claim 3 and 4, and this subject matter also is not seen to be shown by Oohira.

Oohira discloses a composition having lubricity such as a low degree of friction and wear, and capable of supplying a lubricant continuously to a surface of a slide material. The composition comprises a base material, porous silica and a lubricant. Oohira also discloses that polybenzimidazole (PBI) is a possible additive for improving friction and wear characteristics. However, Oohira does not disclose or suggest the use of PBI as a base resin.

In other words, Oohira merely discloses PBI as an equivalent additive to other components in a relatively large basket or shotgun disclosure. Whatever additive is selected, e.g. PBI or one of the other materials listed at column 10, lines 20-34, it is to be added to the base composition. Oohira does not suggest, as claimed, a resin surface layer in which the resin of such resin surface layer is PBI.

Yet a main feature of the present invention is the formation of the surface layer from PBI, noting for example

page 2 of applicant's specification. This is clearly quite different from the use of PBI as an additive, which is the closest that Oohira comes to the present invention.

Therefore, even if it were obvious to modify Kamiya in view of Oohira, one would need to do that which Oohira teaches, namely adding PBI as an additive to the sliding layer of Kamiya. This would not produce applicant's invention.

Applicants respectfully request withdrawal of the rejection.

Claims 1-16 have also been rejected as obvious under §103 from Kamiya in view of Andres et al USP 5,391,605 (Andres) or Korshak et al USP 3,652,408 (Korshak). This rejection is respectfully traversed.

Kamiya has been discussed and described above, and applicant's remarks above relating to Kamiya are respectfully repeated by reference.

Andres discloses a self-lubricating composition suitable for low friction applications, desirably containing about 65-85% of a polymeric blend and about 15-35% of internal lubricants. The polymeric blend consists essentially of about 35-100 weight percent of PBI and up to 65 weight percent of poly(aryletherketone). Such composition can be formed, such as by injection moulding or compression moulding, into shaped articles such as bearings, bearing sleeves, rings, etc. for low

friction uses. The proposed usage of the self-lubricating Andres composition is fundamentally different from that of Kamiya and the present invention wherein usage is in a lubricating multilayer bearing used with internal combustion engines. The conditions of use are so different that the person of ordinary skill in the art would never be led to substitute PBI according to the teachings of Andres for the base polyimide binder of Kamiya.

Korshak discloses an antifriction material comprising 10 to 50% of a polybenzimidazole and 90 to 50% of a filler such as molybdenum disulfide. Korshak implies that PBI has a superior wear resistance, but the antifriction material of Korshak is used under non-lubricant conditions, while the sliding bearing of the present invention is a lubricating multilayer bearing used in internal combustion engines.

Accordingly, Korshak is deficient in a way similar to Andres. The disclosures of these documents, which relate to the use of products under non-lubricant conditions, does not lead the person of ordinary skill in the art to the use of PBI as a base material in a lubricating multilayer bearing used with internal combustion engines, an environment of great heat and pressure in the presence of liquid lubricants.

Applicants respectfully request withdrawal of the rejection.

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Amdt. dated November 25, 2003  
Reply to Office Action of July 1, 2003

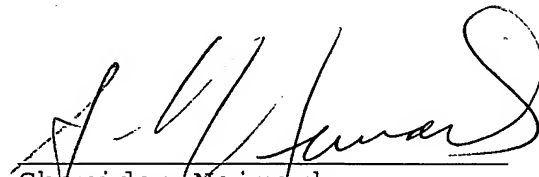
New dependent claims 17 and 18 have been added. As these incorporate the subject matter respectively of claims 1 and 2, they are patentable for the same reasons as claims 1 and 2.

Applicants respectfully request favorable reconsideration and allowance.

Respectfully submitted,

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